

Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

1-62. (Cancelled)

63. **(Currently amended)** A Josephson junction structure comprising:
a substrate; and
a plurality of Josephson junction devices ~~of claim 1~~ formed on the substrate, each of the Josephson junction devices comprising:
an electrode formed on and epitaxial to the substrate, the electrode comprising a first superconductive oxide;
a barrier comprising a non-superconducting, ion-modified surface layer of the first superconductive oxide; and
a counter-electrode formed directly on and epitaxial to the barrier, the counter-electrode comprising a second superconductive oxide, whereby a Josephson junction is formed between the electrode and the counter-electrode,
and the plurality of Josephson junction devices having respective I_c values with a 1σ value within about 7.8% of each other, and respective R_n values with a 1σ value within about 3.5% of each other, at 4.2 K.

64. **(Currently amended)** The Josephson junction structure of claim 63, wherein the plurality of Josephson junctions comprise at least 10 Josephson junction devices ~~of claim 1~~ and having respective I_c values with a 1σ value within about 7.8% of each other, and respective R_n values with a 1σ value within about 3.5% of each other, at 4.2 K.

65. **(Currently amended)** ~~The Josephson junction device of claim 59A~~
Josephson junction device, comprising:

a first layer comprising an oxide high-temperature superconductor;
a second layer comprising an oxide high-temperature superconductor; and
a third layer connecting the first and second layers and comprising a non-
superconductor.

the first and third layers being formed from a starting oxide high-temperature
superconductor layer of an oxide high-temperature superconductor, the third layer being
an ion-modified portion of the starting oxide high-temperature superconductor layer, the
first layer being an unmodified portion of the starting oxide high-temperature
superconductor layer,

the device having an R_nA value of about 1×10^{-9} to about $3 \times 10^{-7} \Omega \cdot \text{cm}^2$ at 4.2 K.

66. (Currently amended) The Josephson junction device of claim 65[2],
wherein the first layer comprises an YBCO superconducting oxide having an R_nA value
of about 1×10^{-9} to about $3 \times 10^{-7} \Omega \cdot \text{cm}^2$ at 4.2 K.

67. (Currently amended) *The device of claim 1* An electronic device
comprising:

a crystalline substrate;

an electrode formed on and epitaxial to the substrate, the electrode comprising a
first superconductive oxide;

a barrier comprising a non-superconducting, ion-modified surface layer of the
first superconductive oxide; and

a counter-electrode formed directly on and epitaxial to the barrier, the counter-
electrode comprising a second superconductive oxide, whereby a Josephson junction is
formed between the electrode and the counter-electrode, having an R_nA value of about
 1×10^{-9} to about $3 \times 10^{-7} \Omega \cdot \text{cm}^2$ at 4.2 K.

68. (Currently amended) The device of claim 67, wherein the first and second
superconductive oxides are YBCO having an R_nA value of about 1×10^{-9} to about 3×10^{-7}
 $\Omega \cdot \text{cm}^2$ at 4.2 K.

69. (Cancelled)

70. (Cancelled)

71. (Currently amended) The Josephson junction device of claim 59A Josephson junction device, comprising:

a first layer comprising an oxide high-temperature superconductor;

a second layer comprising an oxide high-temperature superconductor; and

a third layer connecting the first and second layers and comprising a non-superconductor,

the first and third layers being formed from a starting oxide high-temperature superconductor layer of an oxide high-temperature superconductor, the third layer being an ion-modified portion of the starting oxide high-temperature superconductor layer, the first layer being an unmodified portion of the starting oxide high-temperature superconductor layer,

the device having a J_c value of about 1×10^3 to about 5×10^6 A/cm² at 4.2 K.

72. (Currently amended) The Josephson junction device of claim 7162 wherein the first layer comprises an YBCO superconducting oxide, having a J_c value of about 1×10^3 to about 5×10^6 A/cm² at 4.2 K.

73. (Currently amended) The Josephson junction device of claim 1An electronic device comprising:

a crystalline substrate;

an electrode formed on and epitaxial to the substrate, the electrode comprising a first superconductive oxide;

a barrier comprising a non-superconducting, ion-modified surface layer of the first superconductive oxide; and

a counter-electrode formed directly on and epitaxial to the barrier, the counter-electrode comprising a second superconductive oxide, whereby a Josephson junction is formed between the electrode and the counter-electrode,

the device having a J_c value of about 1×10^3 to about 5×10^6 A/cm² at 4.2 K.

74. **(Currently amended)** The Josephson junction device of claim 73[7],
wherein the first and second superconductive oxides are YBCO having a J_c value of about 1×10^3 to about 5×10^6 A/cm² at 4.2 K.

75. **(New)** The Josephson junction device of claim 65, wherein the third layer is substantially uniform.